

BELYY, B. N.

BELYY, B.N. (Vinnitsa).

Making use of tables in mathematics classes. Mat. v shkole no.1:8-
11 Ja-F '58.

(Mathematics--Tables, etc.)

(MIRA 11:1)

BELYY, B.N.

BELYY, B.N. (Vinnitsa).

Development of methodology in mathematics in the Ukraine during
40 years. Mat.v shkole no.5:22-30 S-0 '57. (MLRA 10:9)
(Ukraine--Mathematics--Study and teaching)

BELYY, B.N. (Drogobych)

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Literature on organizing and supervising practical area measurement. Mat.v shkole no.3:79-80 My-Je '56. (MLRA 9:8)
(Bibliography--Area measurement)

BHLYY, B.N. (Drogobych)

Aleksandr Matveevich Astriab. Mat. v shkole no.5:73-75 S-0 '54.
(Astriab, Aleksandr Matveevich, 1879-) (MLRA 7:11)

BELYY, B.N. (Kiyev).

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Various methods for the solution of problems for on-the-spot determination of inaccessible distances and heights. Mat.v shkole no.6:32-35
N-D '53.

(MLRA 6:12)

(Distances--Measurement)

L 02440-67 EWP(j)/EWT(1)/EWT(m)/T IJP(c) RM/WW
 ACC NR: AP6018794 (A) SOURCE CODE: UR/0314/66/000/002/0022/0023

AUTHOR: Belyy, B. M. (Engineer)

ORG: None

TITLE: End sealing of centrifugal pump shafts

SOURCE: Khimicheskoye i neftyanoye mashinostroyeniye, no. 2, 1966, 22-23

TOPIC TAGS: sealing device, shaft, centrifugal pump, graphitization, carbon, reinforced plastic, hydrocarbon, sulfuric acid, teflon

ABSTRACT: The author describes the development and industrial use of end seals for centrifugal pump shafts used in the following pumps: 4NG-5x1, 4NG-5x4, 5NG-5x1, 4NGK-5x1, 5NGK-5x1, 6NGK-9x1, 8ND-6x1, 4N-5x2, 1.5STsV-1.2, 2.5STsV-0.8, 2.5STsV-1.4, 3STsV-1.5, TsKh-30/60, TsKN-100/80, 1.5VKsS-5x2, 6LK-14-8, and 3KL-7. Three types of centrifugal pump shaft seals are considered. The seals are made in single and double thicknesses with various friction pair materials depending on designation and working conditions. PK-0 graphitized carbon is used where the pressure of the medium is not more than 10 kg/cm², while PT-1000 and 2PT-1000 graphitized carbon and ATM graphite-reinforced plastic are used at pressures up to 20 kg/cm² at a sliding rate of 8-12 m/sec. Left- and right-helix spring-reinforced seals are used in pumps transferring hydrocarbons, benzene, α -methylstyrene, copper ammonium

Card 1/2

UDC: 62-762:621.671

SUB CODE: 13, 11/

Card 2/2

BELYY, B.M., inzh.

Surfacing and finishing of sealing surfaces with number one sormite.
Energetik 13 no.1:19 Ja '65. (MIRA 18:3)

BELYY, B.M.

Device for removing tooth facets of a segment saw. Mashinostroitel'
no.1:26 Ja '65.
(MIRA 18:3)

BELYY, B.M. [Bilyi, B.M.], dotsent

Use of computation tables in mathematics lessons in grades 5-7.
Dop. ta pov. Vinn. der. ped. inst. no. 7:88-91 '58. (MIRA 14:1)
(Mathematics--Tables, etc.)

ZHDANOV, B.V.[deceased]; HELYY, B.D., inzhener, retsentsent; MANAKIN, N.V.,
redaktor; MATVEENKO, Ye.M., tekhnicheskiy redaktor.

[Servicing electric bridge and gantry cranes] Obsluzhivanie mostovykh i kozlovyykh elektricheskikh kranov. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry, 1956. 118 p. (MLRA 9:5)
(Cranes, derricks, etc)

KHAZANOV, I.S.; KUCHERUK, V.V.; BELYANSKIY, P.P.; BELYI, B.D., inzhener, retsenzent; KUGINIS, B.L., inzhener, retsenzent; VINOGRADSKIY, N.V., dotsent, redaktor; MATVEYEVA, Ye.N., tekhnicheskiy redaktor; SOKOLOVA, T.F., tekhnicheskiy redaktor

[Operation and repair of ventilation equipment in machinery factories]
Eksploatatsia i remont ventilatsionnykh ustanovok mashinostroitel'-
nykh zavodov. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroitel'noi
lit-ry, 1954. 203 p. (MLRA 8:4)
(Factories--Heating and ventilation)

BELYY, B.A.

ZHURAVKOV, M.G., doktor filosofskikh nauk, polkovnik, nauchnyy sotrudnik,;
BELYY, B. A., dots, polkovnik, nauchnyy sotrudnik,; SHABAYEV, G.Ye.,
kand. istoricheskikh nauk, polkovnik, nauchnyy sotrudnik,;
ZAKHAROV, V.A., kand. istoricheskikh nauk, polkovnik, nauchnyy
sotrudnik,; MIKHAYLENKO, N.N., kand. istoricheskikh nauk, polkovnik,
nauchnyy sotrudnik,; MARYGANOV, I.V., dots, polkovnik, nauchnyy
sotrudnik,; ARISTOV, A.D., polkovnik, red.; KONOVALOVA, Ye. K., tekhn. red.

[Moral and political factors in modern war] Moral'no-politicheskii
faktor v sovremennoi voine. Moskva, Voen. izd-vo M-va obor. SSSR,
1958. 310 p.
(MIRA 11:12)

1. Voenno-politicheskaya krasnoznamennaya akademiya imeni V.I.
Lenina (for all except Aristov, Konovalova).
(Morale)

BATALOV, Nikolay Mikhaylovich; BELYI, Balentin Antonovich; IOFFE, Aleksandr Borisovich; RABINOVICH, Aron Abramovich; SIMAYSKIY, Mikhail Mikhaylovich; IVANOV, V.M., red.; VORONIN, K.P., tekhn.red.

[Electric motors for cranes and metallurgical plants; theory, construction, use] Kranovo-metallurgicheskie elektrodvigateli; teoriia, konstruktsiia, primeneniie. Pod obshchei red. A.A. Rabinovicha. Moskva, Gos. energ. izd-vo, 1958. 168 p. (MIRA 11:5)
(Electric motors)

BEINY, N. A.

LEVANOV, I.N., polkovnik, redaktor; BELYY, B.A., polkovnik, redaktor;
NOVOSELOV, A.P., polkovnik, redaktor; ARISTOV, A.D., redaktor;
VOLKOVA, V.Ye., tekhnicheskii redaktor

[Marxism-Leninism on war and armies] Marksizm-leninizm o voine i
armii. Pod obshchei red. I.N.Levanova, B.A.Belogo i A.P.Novoselova.
Moskva, Voen.izd-vo M-va obor.SSSR, 1957. 285 p. (MLRA 10:10)

1. Voenno-politicheskaya krasnoznamennaya akademiya imeni V.I.
Lenina

(War) (Armies)

NIKOLENKO, V.I.; PANFILOVA, I.P.; PAKHOMOV, V.I.; BELYY, A.P.

Properties of KF-9 high-frequency molding composition. Plast.massy no.4:
25-26 '63. (MIRA 16:4)
(Plastics) (Electric insulators and insulation)

Properties of high-frequency...

S/191/63/000/004/007/015
B101/B186

$\epsilon = 3.2$; $E = 19.7$; $\sigma_1 = 31.5$; $\sigma_0 = 390$; $\sigma_a = 476$. After 2160 hrs of tropical humidity: $q_v = 2 \cdot 10^{14}$; $q_s = 2 \cdot 10^{14}$; $\tan \delta = 0.0100$; $\epsilon = 3.25$; $E = 16.9$. The dielectric properties of KF-9 changed only slightly after 1500 hrs of ageing at 300°C and subsequent storage for 100 hrs in the moist chamber, containing 98% moisture. The loss in weight was 0.57 - 0.90% after 10 hrs at 300°C and 0.7 - 1.25% after 210 hrs. The material can be used for 1000 hrs at temperatures between -60 and $+250^\circ\text{C}$, withstanding $+300^\circ\text{C}$ for one hour. The material is not liquid when cold, and can be processed by molding or compression molding (different to fluoroplast-4 (Teflon-4)). There are 4 figures and 3 tables.

BELYI, A. P.

S/191/63/000/004/007/015
B101/B186AUTHORS: Nikolenko, V. I., Panfilova, I. P., Pakhomov, V. I., Belyi,
A. P.

TITLE: Properties of high-frequency KФ-9 (KF-9) molding material

PERIODICAL: Plasticheskiye massy, no. 4, 1963, 25 - 26

TEXT: The physicomachanical and dielectric properties of the high-frequency thermosetting KF-9 material were tested. Its dielectric properties are similar to those of polytetrafluoroethylene. For the initial material, the following data are given: $q_v = 2 \cdot 10^{16}$ ohm·cm; surface resistivity $q_s = 2 \cdot 10^{16}$ ohm; $\tan \delta = 0.00626$ at 10^6 cps; dielectric constant $\epsilon = 3.02$; breaking voltage $E = 17.05$ kv/mm; impact strength $\sigma_i = 35.0$ kg·cm/cm²; bending strength $\sigma_b = 479$ kg/cm²; compressive strength $\sigma_c = 356$ kg/cm². After a threefold thermal shock by changing the temperature from +360°C to -60°C, the values changed as follows: $q_v = 1 \cdot 10^{15}$; $\tan \delta = 0.00427$;

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Influence of some ...

S/661/61/000/006/005/081
D205/D302

of preparation, were entirely different in their activity. Thus, the alloys prepared from the purified Si gave a much lower dimethyl dichlorosilane yield than those made of the non-purified Si. The average figures were 34.0% and 41.0% respectively. The introduction of Al (up to 1.5%), Fe (up to 3%), Ca (up to 0.6%), each taken separately, had very little influence on the activity of the alloys prepared from purified and non-purified Si. The use of Kr-2 silicon gives worse results. Pb and Bi have a strong detrimental influence on the activity of the alloys even at a concentration of 0.01% only, while the results obtained on the introduction of Sn were irreproducible. There are 9 tables.

Card 2/2

BELYY A.P.

37754

S/661/61/000/006/005/031
D205/D302

5:3700
11.1250

AUTHORS: Lobusevich, N. P., Trofimova, I. V., Andrianov, K. A.,
Golubtsov, S. A. and Belyy, A. P.

TITLE: Influence of some metal additives on the activity of
silicon-copper alloys in the synthesis of methyl chloro-
silanes

SOURCE: Khimiya i prakticheskoye primeneniye kremneorganiches-
kikh soyedineniy; trudy konferentsii. no. 6, Doklady,
diskussii, resheniye. II Vses. konfer. po khimii i
prakt. prim. kremneorg. soyed., Len., 1958. Leningrad.
Izd-vo AN SSSR. 1961, 28-31

TEXT: The influence of impurities commonly encountered in silicon
(Al, Fe, Ca) and copper (Bi, Sn, Pb) on the activity of silicon-
copper alloys used in methyl chlorosilane synthesis was investiga-
ted. Two series of alloys were prepared: 1) From purified Si with
less than 0.2% of impurities; 2) from Kp-1 (Kr-1) silicon with 2%
impurities. These alloys, notwithstanding the identical procedure

Card 1/2

FLID, R.M.; KRASOTKIN, A.Ye.; SHPICHINetskaya, L.S.; CHIRIKOVA, A.V.;
BELYI, A.P.; BARATS, M.I.; KRUPTSOV, B.K.; BELYANINA, Ye.T.

Effect of alkaline admixtures on catalytic oxidation of primary
alcohols to aldehydes. Khim.nauk i prom. 3 no.5:683 '58.

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V.
Lomonosova.

(Alcohol) (Oxidation) (Catalysts)

25-11, 11/11
CA

13

Dimethylolurea for the production of plastic materials
G. S. Petrov and A. P. Belyi, *Org. Chem. Ind. (U.S.S.R.)*
R 5,506 17 (1968); *cf. C.A.A. 31, 7550*. The discussion
is continued. Chris. Blane

ASAC 51.1.1 METALLOGICAL LITERATURE CLASSIFICATION

BELYY, A.D.

Engineering geology's systematics and classification of rocks.
Bul.MOIP. Otd.geol. 31 no.4:107-108 J1-Ag '56. (MLRA 9:12)

(ROCKS--Classification and nomenclature)

BELYY, A. [Bilyi, A.]

We are changing over to the production of hollow bricks. Sil'.bud.
9 no.10:9 0 '59. (MIRA 13:3)

1. Glavnyy inzhener Starokozatskoy mezhkolkhoznoy stroitel'noy
organizatsii Odesskoy oblasti.
(Starokazachya--Hollow bricks)

EELYUSTINA, L.N.; DUDNIK, R.A.

Letters to the editor. Izv. vys. ucheb. zav.; radiofiz. 6 no.5:
1075 '63. (MIRA 16:12)

BAUTIN, N.N.; BELYUSTINA, L.N.

Fallibility of N.F.Strokov's article "Existence of saddle-to-saddle
separatrices." Izv.AN SSSR,Mekh. i mashinostr. no.5:206-207 S-0
'63. (MIRA 16:12)

BELYUSTINA, L. N. (Gor'ky)

"Qualitative investigation of non-autonomous periodical systems close to rough autonomous systems"

report presented at the 2nd All-Union Congress on Theoretical and Applied Mechanics, Moscow, 29 Jan - 5 Feb 1964.

Small periodic perturbations ...

S/020/63/148/002/002/037
B187/B112

that enclose non-singular trajectories, then at sufficiently small $\mu \neq 0$, the singular integral areas which in the x_1, x_2, t -space originate from solutions of the perturbed systems and whose initial values belong to singular invariant curves, divide the region G_t into subregions such that every subregion encloses only solutions of the perturbed system with equal asymptotic behavior. For $\mu = 0$, these subregions are transformed into subregions existing for the rough autonomous system in the x_1, x_2, t -space.

ASSOCIATION: Issledovatel'skiy fiziko-tekhnicheskiy institut
Gor'kovskogo gosudarstvennogo universiteta im. N. I.
Lobachevskogo (Research Physicotechnical Institute of
Gor'kiy State University imeni N. I. Lobachevskiy)

PRESENTED: July 7, 1962, L. S. Pontryagin, Academician

SUBMITTED: June 30, 1962

Card 2/2

45451

S/020/63/148/002/002/037
B187/B112AUTHOR: Belyustina, L. N.

TITLE: Small periodic perturbations of a rough autonomous system

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 2, 1963, 251-254

TEXT: For the qualitative study of non-autonomous systems an important election of singular manifolds of the phase space is made, which divide from one another those domains that have solutions of different asymptotic behavior. For this purpose, a specialization of results by N. Levinson (Ann. of Math., v. 52, no. 3, 1950) and a study of mappings produced by the solutions of the set of equations and of their fixed points are used. $dx_i/dt = X_i(x_1, x_2) + \mu R_i(x_1, x_2, t)$ with $i = 1, 2$ is the perturbed system, and $dx_i/dt = X_i$ is the rough autonomous system. $G_t \{(x_1, x_2) \in G, -\infty < t < +\infty\}$ is the domain of definition; R_i = periodic functions of t , and X_i and R_i belong to the class $C^{(3)}$. If the singular trajectories of the rough autonomous system divide the domain G of the x_1, x_2 -plane into subregions

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BATALOVA, Z.S.; BELYUSTINA, L.N.

Study of a nonlinear system on torus. Izv. vys. ucheb. zav.;
radiofiz. 6 no.1:149-165 '63. (MIRA 16'7)

1. Nauchno-issledovatel'skiy fiziko-tekhnicheskiy institut pri
Gor'kovskom universitete.

(Differential equations)

ARONOVICH, G.V.; BELYUSTINA, L.N.; KARTVELISHVILI, N.A.; LYUBIMTSEV, Ya.K.

Problems of the stability of stationary operating conditions of
hydroelectric generating stations and power systems viewed as
problems of the theory of oscillations. PMTF no.3:56-73 S-0 '61.
(MIRA 14:8)

(Hydroelectric power stations) (Oscillations)

BELYUSTINA, I. N. and ANDRONOVA-LEONTOVICH, YE. A.

"The theory of bifurcation of the dynamical systems of the second order and its application to the investigation of the nonlinear problems of the theory of oscillations."

Paper presented at the Intl. Symposium on Nonlinear Vibrations, Kiev, USSR, 9-19 Sep 61

Research Institute of Technical Physics, Gorky State University, Gorky

BELYUSTINA, L. N., KARTVELISHVILI, N. A., LYUBINTSEV, YA. K. and ARGOVICH, V. V.

"Application of oscillatory system analysis to stability problems
in the steady-state operation of hydroelectric stations and power
system."

Paper presented at the Intl. Symposium on Nonlinear Vibrations, Kiev, USSR,
9-19 Sep 61

Research Institute of Technical Physics, Gorky State University, Gorky

86870

S/141/60/003/005/025/026
E192/E382

Excitation of Oscillations in a Nonlinear Phase-type Automatic
Frequency Control System with a Lagging Argument

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-tekhnicheskiy
institut pri Gor'kovskom universitete
(Scientific Research Physico-technical
Institute of Gor'kiy University)

SUBMITTED: June 28, 1960

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E192/E382

Excitation of Oscillations in a Nonlinear Phase-type Automatic Frequency Control System with a Lagging Argument

for a fixed k , is shown in a figure. When the curve is intersected between $d < d_E$ and $d > d_E$, the real part of one of the roots of Eq. (4) changes its sign and becomes positive. The differential stability of Eq. (2) is therefore determined by:

$$0 \ll \gamma < 1; \quad 0 \ll d < d_E \quad (6).$$

There are 1 figure and 4 Soviet references.

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Excitation of Oscillations in a Nonlinear Phase-type Automatic Frequency Control System with a Lagging Argument

the equation for λ_k is in the form:

$$r^2 + kT'r + \gamma_2 e^{-r} = 0 \quad (4)$$

where $r = \lambda T'$ and $\gamma_2 = \sqrt{(1 - \gamma^2)} T'$. By assuming that $r = i\omega$, a curve can be plotted in the space of the parameter γ and $d \equiv T'/k$. Purely imaginary roots defined by:

$$\gamma = \sqrt{1 - k^4 / \text{tg}^2 \omega \sin^2 \omega}; \quad d = (\omega/k^2) \text{tg} \omega \quad (5)$$

correspond to the points of this curve. The curve contains an infinite number of branches, each of which correspond to a certain interval ω . The branch E of the curve defined by Eqs. (5), which is nearest to the axis $d = 0$

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where $p' = \sqrt{T/\Omega} p$, $k = 1/\sqrt{T\Omega}$, $T' = \sqrt{\Omega/T} T_1$, $\gamma = \delta\omega/\Omega$. This nonlinear equation for $T' > 0$ is equivalent to the nonlinear differential equation of the infinite order. Eq. (2) can be linearised and this procedure leads to two linear equations with a lagging argument:

$$d\varphi_1/dt = y, \quad dy/dt = -\lambda\gamma - \sqrt{1 - \gamma^2} \varphi_1(t - T') \quad (3)$$

where $\varphi_1 = \varphi - \varphi_0$ where $\varphi_0 = \arcsin \gamma$ ($0 \ll \varphi_0 \ll \pi/2$). By assuming that the solution of Eqs. (3) is in the form of:

$$\varphi_1 = \sum A_k e^{\lambda_k t}, \quad y = \sum B_k e^{\lambda_k t}$$

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E192/E382

Excitation of Oscillations in a Nonlinear Phase-type Automatic Frequency Control System with a Lagging Argument

where $F(\varphi)$ is the nonlinear phase characteristic,
 φ is the phase difference between the controlled
 and the standard oscillator,
 Ω is the maximum detuning produced by the phase
 detector and the reactance tube, and
 $\delta\omega$ is the detuning of the controlled oscillator with
 respect to the standard.

Eq. (1) takes into account the delay produced by the delay network. If the phase characteristic $F(\varphi) = \sin \varphi$ and $K(p) = 1/(1 + Tp)$, where T is a time constant, Eq. (1) can be written as:

$$p'^2 \varphi + kp' \varphi + e^{-T'p'} \sin \varphi = \gamma \quad (2)$$

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E192/E382

6.4420

AUTHOR: Belyustina, L.N.

TITLE: Excitation of Oscillations in a Nonlinear Phase-type
Automatic Frequency Control System with a Lagging
Argument

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy,
Radiofizika, 1960, Vol. 3, No. 5, pp. 909 - 911

TEXT: The time delay in phase-type automatic frequency
control systems can be taken into account by considering the
effect of the inertia due to the selective properties of the
resonant circuits. The transfer function of an ideal delay element

should be $e^{-T_1 p}$ where T is the delay time. The differential
equation of a phase-frequency control system with a low-
frequency filter, whose transfer coefficient is $K(p)$, is

$$p\varphi + \Omega K(p)e^{-T_1 p} \dots F(\varphi) = \delta\omega \quad (1)$$

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69957
SOV/141-2-4-12/19

Determining The Qualitative Structure of a "Coarse" Dynamic System
by Means of Approximate Plotting of Singular Trajectories

analogous "analytical measure". An approximate solution to Eq (1) can be found, called an ϵ -solution, and the procedure is to be found in Ref 8. It is repeated here for equilibrium points, saddle points (Figure 2) and limit cycles. In connection with the latter, two theorems are put forward: the qualitative structure of a plane region can be divided up into trajectories in a finite number of operations with sufficient accuracy depending on the geometric measure of coarseness: the same procedure for a "fine" system defined by Eq (1) and with $n \geq 1$ is not possible. The assistance of Ye.A. Andronova-Leontovich is acknowledged. There are 9 figures and 13 Soviet references.

ASSOCIATION: Nauchno-issledovatel'skiy fiziko-tekhnicheskiy
institut pri Gor'kovskom universitete (Physico-technical
Scientific Research Institute of Gor'kiy University)

SUBMITTED: April 10, 1959

Card 5/3

69957

SOV/141-2-4-12/19

Determining the Qualitative Structure of a "Coarse" Dynamic System
by Means of Approximate Plotting of Singular Trajectories

is finite. Throughout the analysis an important part is played by the idea of the "canonical region" adjacent to an equilibrium point or limit cycle. To be canonical, a region must contain a focus or node and satisfy two conditions: a) apart from the singularities mentioned there should be no other singular trajectory; b) if a singular trajectory does come into the region when the variable t increases or decreases, then for a further change in t it can no longer come out of the region. If the conditions are satisfied for a saddle-point the region is said to be a circular region of the point. Geometrical illustrations of the definitions are given in Figure 1. In Figure 1B for example, the regions G_1 and G_2 are canonical but G_3 is not. According to Ref 1, the phase-plane may be completely described by trajectories if four conditions (which are quoted) are observed. The idea of a "geometrical measure of coarseness" is introduced and reference made (footnote p 641) to an

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AUTHOR: Belyustina, L.N. SOV/141-2-4-12/19

TITLE: Determining the Qualitative Structure of a "Coarse" Dynamic System by Means of Approximate Plotting of Singular Trajectories ✓

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika, 1959, Vol 2, Nr 4, pp 638 - 653 (USSR)

ABSTRACT: The paper was presented at a scientific conference at Gor'kiy University on the 40th anniversary of the Revolution (December 20, 1957). The system is described by the first-order equations of Eq (1) and a modification to the system by Eq (2). The functions P , Q , p and q are defined within the region G in the plane x, y . The region is bounded by a simple closed curve g forming a non-contact cycle. It is assumed that the system defined in Eq (1) is "coarse". Refs 3 and 4 define "coarse" systems and distinguish between them and "fine" systems. All the equilibrium states and limit cycles of a coarse system are simple and semi-separatrices do not extend between saddle-points; hence the number of singular trajectories

Card1/3

05491

SOV/141-2-2-16/22

Investigation of a Non-linear System of Automatic Phase-type Frequency Control

ASSOCIATION: Issledovatel'skiy fiziko-tekhnicheskiy institut pri
Gor'kovskom universitete (Physics-engineering Research
Institute of Gor'kiy University)

SUBMITTED: November 26, 1958

Card 6/6

05491

SOV/141-2-2-16/22

Investigation of a Non-linear System of Automatic Phase-type Frequency Control

first kind. Secondly, the amplitude of φ in the unstable region increases as $|\varphi| = \arccos(1/d)$. Finally, the system does not contain any semi-stable limit cycles of the second kind. The stable equilibrium states of the system correspond to the steady-state operation of the system at a constant phase difference and a zero frequency difference (synchronism). The limit cycle of the first kind represents the steady-state operation in the presence of beats, which produce periodic phase and frequency deviations in the vicinity of the constant phase and zero frequency difference. The stable limit cycle of the second kind corresponds to the beats-type operation when a periodic frequency difference is encountered in the presence of an infinitely increasing phase difference.

There are 11 figures and 19 references, of which 14 are Soviet, 3 Italian and 2 German.

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SOV/141-2-2-16/22

Investigation of a Non-linear System of Automatic Phase-type Frequency Control

λ and d (see Figure 6). Figure 7 shows the sections $\gamma = \text{const.}$ and $d = \text{const.}$ of the surface $\lambda = \lambda_0(\gamma, d)$

which were obtained by constructing the separatrices joined to saddle points. For $d > 1$, there exists a bifurcation surface W , where the separatrix of the saddle point at $z = 0$ proceeds from the saddle to the same saddle point and envelopes the cylinder. Various cases of the bifurcation surface are illustrated in Figures 10. The limit cycles for d lying in the interval from zero to one can be determined by means of the Bendikson (Refs 5 and 16) criterion. It is found that the system has no limit cycles of the first kind but it possesses one limit cycle of the second kind; the cycle is unique. For $d > 1$, the Bendikson criterion is inapplicable. A different approach is therefore employed (A.A. Andronov et al., Refs 14, 17, 18) and it is shown that the system contains the limit cycles of the first and the second kind. The instability region is contained inside the cycle of the

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Investigation of a Non-linear System of Automatic Phase-type Frequency Control

is a focus or a node. This is illustrated in Figure 2, which represents a surface $\delta = 0$ which separates the region $\delta > 0$ of the space of the parameters γ, λ, d from the region $\delta < 0$. The critical directions κ_{12}

of the saddle $(\varphi_1, 0)$ are determined by Eq (6). They determine the directions of the tangents to the separatrices at the saddle. The separatrices of the saddle $(\varphi_1, 0)$ having negative slopes are denoted by S_1 and S_2 (in the upper semi-plane), while those with the positive slopes are denoted by S_3 and S_4 (in the lower semi-plane).

For the case of $\lambda \neq 0$ and d lying between zero and one, the separatrices are in the form of the solid curves shown in Figures 3 (the dotted curves represent the conservative system). A surface W is introduced; this is represented by the equation $\lambda = \lambda_0(\gamma, d)$ and

Card3/6 represents a surface in the space of the parameters $\gamma,$

05491

SOV/141-2-2-16/22

Investigation of a Non-linear System of Automatic Phase-type Frequency Control

$z = d\varphi/d\tau$. Eq (1) is written as Eqs (2). The equivalent differential equation to be solved is therefore in the form:

$$dz/d\varphi = [\gamma - \sin \varphi - \lambda(1 - d \cos \varphi)z] / z \quad (3)$$

The phase space of such a system is in the form of the surface of a circular cylinder whose axis is parallel to the axis z . The qualitative analysis of Eq (3) permits the division of the space of the characteristic parameters of the system into regions where the system has various operating conditions. When $\lambda = 0$, the system is conservative and z is given by the second equation on p 278. The co-ordinates of the equilibrium states are determined by Eqs (4). The phase trajectories for this case are illustrated in Figures 1. When $\lambda \neq 0$ and $d \geq 0$, the co-ordinates of the equilibrium states of the system can again be determined by means of Eqs (4). The equilibrium state $(\varphi = 1, z)$ for any $d \geq 0$ and $\lambda < 1$ is in the form of a saddle. The equilibrium state $(\varphi_2 = 0)$

Card2/6

05491

AUTHOR: Belyustina, L.N.

SOV/141-2-2-16/22

TITLE: Investigation of a Non-linear System of Automatic Phase-type Frequency Control

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiofizika. 1959, Vol 2, Nr 2, pp 277 - 291 (USSR)

ABSTRACT: The differential equation of the system with a delay can be written as (M.V. Kapranov - Ref 1):

$$p\varphi + \Omega(1 - T_1 p)K(p)F(\varphi) = \delta\omega \quad (1)$$

where φ is the difference between the phases of the oscillations of the tuned and the standard oscillators, $K(p)$ is the transfer function, $F(\varphi)$ is the characteristic of the phase detector, Ω is the maximum detuning of the system produced by the phase detector and the reactance tube, T_1 is the delay time and $\delta\omega$ is the detuning of the controlled generator, relative to the standard oscillator. It is assumed that $F(\varphi) = \sin \varphi$ and $K(p) = (Tp + 1)^{-1}$ where T is the time constant. By introducing the notation

Card1/6 $\gamma = \delta\omega/\Omega$, $\tau_0 = \sqrt{\Omega/T}$, $\lambda = 1/\sqrt{\Omega T_1}$, $d = \Omega T_1$ and

BELYUSTINA, L.N.

Splitting a cylindrical phase surface into trajectories. Izv.vys.
ucheb.zav.; radiofiz. 1 no.2:118-130 '58. (MIRA 11:11)

1. Issledovatel'skiy fiziko-tekhnicheskiy institut pri Gor'kovskom
universitete.
(Oscillations) (Differential equations)

BELYUSTINA, L. N.

"On the Dynamics of a Symmetrical Flight of an Airplane," by
L. N. Belyustina, Gor'kiy, Izvestiya Akademii Nauk SSSR,
Otdeleniye Tekhnicheskikh Nauk, No 11, Nov 56, pp 3-27

This work investigates the problem of the possible motions of an airplane in the vertical plane with a constant angle of incidence, under the action of propeller pull and frontal resistance. It presents a qualitative investigation of differential equations of motion. On the basis of the study of the bifurcation of the system the parameter planes are broken down into regions corresponding to the various motions of the airplane.

If propeller pull and drag are taken into account, the equations of motion cannot be integrated in quadratures.

The article presents the solution of problems on the possible motion of an airplane in the vertical plane in the general case: under the action of propeller pull and drag. A table is presented which determines the trajectories of aircraft flight for various types of phase trajectory systems.

Sum 1239

BELYUSTINA, L.N.

124-1957-2-1485 D

Translation from: Referativnyy zhurnal. Mekhanika, 1957, Nr 2, p 6 (USSR)

AUTHOR: ~~Belyustina L.N.~~

TITLE: Qualitative Investigation of Dynamic Systems Having a Cylindrical Phase Surface (Kachestvennoye issledovaniye dinamicheskikh sistem s tsilindricheskoy fazovoy poverkhnost'yu)

ABSTRACT: Bibliographic entry on the Author's dissertation for the degree of Candidate of Physico-Mathematical Sciences, presented to the Gor'kovsk. un-t (Gor'kiy University), Gor'kiy, 1956

ASSOCIATION: Gor'kovsk. un-t (Gorkiy University), Gor'kiy

1. Dynamics 2. Mathematics

Card 1/1

The phase space natural to this problem is the surface of a cylinder. The existence and stability of singular points and limit cycles on the cylinder are studied. It is shown that the only stationary modes of operation of the motor are: (1) synchronous rotation without vibration and (2) rotation which varies in magnitude but with a constant direction of sliding. The first corresponds to a stable singular point. The second corresponds to a stable limit cycle encircling the cylinder.

It is shown that for some values of the parameters k , r , and T , some initial conditions give rise to (1) and other initial conditions lead to (2). Conditions on the parameters are also given under which all initial conditions lead to (1).

J. P. LaSalle (Notre Dame, Ind.)

Belyustina, L. N.

★ Belyustina, L. N. On an equation from the theory of 1 - F/W
~~electrical machines.~~ Pamyati Aleksandra Aleksan-
 drovicha Andronova [In memory of Aleksandr Aleksan-
 drovich Andronov], pp. 173-186. Izdat. Akad. Nauk
 SSSR, Moscow, 1955. 36.40 rubles.

A qualitative study is made of the solutions of the non-
 linear differential equation

$$\frac{d^2\theta}{dt^2} + k \frac{d\theta}{dt} + \sin \theta + r \sin 2\theta = T.$$

This differential equation is related to the oscillation of
 the rotor of a synchronous motor with asynchronous
 starting. The angle between the field of the rotor and the
 revolving magnetic field of the stator is the term θ . The
 constant k depends on friction and electrical damping.
 The term T represents the external loading of the motor
 and is assumed to be a constant. The sine terms approxi-
 mate the moment due to the angle between the rotor and
 stator fields.

(DV-13)

309

BELYUSTINA, L. N.

USSR/Mathematics - Qualitative topological behavior

FD-848

Card 1/1 : Pub. 85 - 13/14

Author : Belyustina, L. N. (Gor'kiy)

Title : Conditions for the existence of a center

Periodical : Prikl. mat. i mekh., 18, 511, Jul/Aug 1954

Abstract : Gives the conditions for the existence of a center at the point (0,0) for the nonlinear differential equation: $dy/dx = (-x - Ax^2 - Bxy - Cy^2)/(y - Dx^2 - Exy - Fy^2)$ in terms of the coefficients A, B, C, D, E, F. Notes that N. A. Sakharnikov also treated this problem (PMM, 12, 1948).

Institution : --

Submitted : November 23, 1953

BELYUSTINA L. N.

USSR:

Belyustina, L. N. On the stability of the operating regime of a salient-pole synchronous motor. Izv. Akad. Nauk SSSR. Otd. Tehn. Nauk 1954, no. 10, 131-140 (1954). (Russian)

The author considers the differential equation

$$\ddot{\theta} + k(1 - b \cos 2\theta)\dot{\theta} + \sin \theta + r \sin 2\theta = T$$

where k , b , r and T are constants and $\dot{\theta} = d\theta/dt$. Setting $\theta = s$, the equation is replaced in the usual way by a pair of first-order autonomous equations in the (s, \dot{s}) phase-plane which are studied by considering the nature of the singular points in the phase-plane. N. Levinson (Cambridge, Mass.).

MS 1-F/W

62

1. BELYUSTINA, L. N.; ARONOVICH, G. V.
2. USSR (600)
4. Water towers
7. On the stability of fluctuations of the level in a surge tank,
Inzh. sbor., No. 13, 1952.

9. Monthly List of Russian Accessions, Library of Congress, April,
1953, Uncl.

TACTIC, H.

Firing practice for submachine runners in landing assaults. 10 p.

Tarkist, o 12, 1946.

BELLYUSTIN, S.V.

Capacitance in a stationary charge distribution between electrodes.
Radiotekh. i elektron. 7 no.3:491-498 Apr '62. (MIRA 15:2)
(Electric capacitance)
(Electric charge and distribution)

L 21124-66

ACC NR: AP6011960

The effect of KOH (NaOH behaves similarly) is much more complex. As the pH rises, the growth rate of all faces decreases, and the growth rate of the (100) face experiences a rather abrupt drop almost to zero, apparently due to the formation of a new substance.

Borax has the most complicated decelerating influence on the growth rates. Similarity of its effect on the (100) and (211) faces with that of Bismarck brown indicates that they act in the same fashion despite the fact that they have no other apparent similarity.

Conclusions reached indicate that absorption of the impurity on the crystal faces (primarily the cubic) strongly affects growth rates either directly or through the chemical formation other substances. The faces (111), (221), and (110) are actively affected by the pH of the solution. Large ion concentrations affect all faces more or less uniformly. The authors thank Academician A. V. Shubnikov for discussions and valuable advice. Orig. art. has: 2 figures. [JPRS]

SUB CODE: 20, 07 / SUBM DATE: 08Jul64 / ORIG REF: 005 / OTH REF: 001

Card 2/2 dda

L 21124-66 EWT(1)/T LIP(c) GG

ACC NR: AP6011960

SOURCE CODE: UR/0070/65/010/003/0362/0367

AUTHOR: Portnov, V. N.; Belyustin, A. V.

ORG: Gor'kiy Physicotechnical Research Institute (Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskii institut)

TITLE: Effect of impurities on rate of growth of aluminum potassium sulfate crystal faces from solution

SOURCE: Kristallografiya, v. 10, no. 3, 1965, 362-367

TOPIC TAGS: crystal growth, crystallization, crystal impurity, crystal surface, sulfuric acid

ABSTRACT: The method of spherical crystallization was used to study the growth rate of the (111), (110), (100), (221), and (211) faces of $\text{KAl}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$ from solutions in the presence of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, H_2SO_4 , Bismarck-brown dye, KOH , NaOH , and Borax. The initial spherical form provides many faces for measurement, and the spherical shape is maintained because the growth rate of the faces depends strongly on the shape of the crystal. Growth rates of the different faces as a function of concentration are plotted for the various impurities. Na_2SO_4 and $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ behave similarly in that they decelerate the growth rate of all faces more or less uniformly with increasing concentration. H_2SO_4 , on the other hand, slightly accelerates the growth of all faces, especially the (221) face. Bismarck brown seriously damages the (211) and (221) faces and severely decelerates the growth of the other faces, apparently, because it is absorbed on the crystal surfaces.

Card 1/2

UDG: 548.523

L 5081-66 EWT(1)/T IJP(c) 32

ACC NR: AP5024559

III/0070/65/010/005/0743/0745

AUTHOR: Belyustin, A. V.; Stepanova, N. S.

TITLE: Method of growing crystals from solutions under static conditions

SOURCE: Kristallografiya, v. 10, no. 5, 1965, 743-745

TOPIC TAGS: crystal growing, thermostat, potassium compound

ABSTRACT: An earlier article (A. V. Belyustin, Kristallografiya, 6, 5, 807-808, 1961) described a very simple method of growing crystals from solutions under static conditions without thermostating (at room temperature). In the present paper, some improvements and modifications of this method are discussed. They concern primarily the insert of the crystallizer; the principle of the method and the shape of the crystallizer remain the same. Another improvement is the addition of thermostating; a suitable thermostat is described. The constant temperature and unchanging supersaturation achieved through the use of this thermostat minimize the strains in the crystals, and there are other practical advantages such as the simultaneous growing of a large number of crystals in separate crystallizers, small volume of solution, etc. Crystals of potassium phosphate dihydrate grown by this technique are illustrated. Orig. art. has: 2 figures.

ASSOCIATION: Gor'kovskiy issledovatel'skiy fiziko-tekhnicheskiy institut (Gorkiy Physico-technic Research Institute)

SUBMITTED: 25Nov64

ENCL: 00

SUB CODE: SS

NO REF SOV: 001

OTHER: 000

Card 1/1

0743/0745

PORTNOV, V.N.; BELYUSTIN, A.V.

Effect of impurities on the rate of growth of the faces of
potassium aluminosilicates from a solution. Kristallografiia
10 no.3:362-367 My-Je '65. (MIRA 18:7)

1. Gor'kovskiy fiziko-tekhnicheskii institut.

BELYUSTIN, A.V.; PORTNOV, V.N.

Effect of borax on the rate of growth of alum crystals from
a solution. Rost krist. 4:36-38 '64. (MIRA 17:8)

BELYUSTIN, A.V.; Prinimali uchastiye: KARAMYSHEVA, Zh.V.; VETKHINA, L.P.

Effect of impurities on the growth of crystals and its dependence
on the pH of the solution. Rost krist. 4:10-14 '64.
(MIRA 17:8)

BELYUSTIN, A.V.; ROGACHEVA, E.D.

Formation of crystallization centers in the presence of the
seed crystal. Rost krist. 4:5-9 '64. (MIRA 17:8)

L 18912-63

ACCESSION NR: AT3001901

①
lattice therein. Spherical crystallization of 4 substances that pertain to the rhombic syngony is also described, together with the faces developed. A theoretical attempt to find a method for utilizing the first and second distances between the lattice points in the HKL planes for the construction of the sequence of phases did not lead to any agreement with the experimental data. The experimental findings and the relatively small deviations from the calculated order of the faces do not support any general conclusion on the role of the lattice in their formation. There is no basis for any assertion that the complex of possible faces or the external shape of the crystals (even in a statistical sense) are exclusively determined by the lattice or other geometric conditions. In general it may also be noted that the more complex the structure, the smaller is the significance of the peculiarities of individual atoms or the bonds between them. By contrast, for simple structures, deviations from the calculated complex of faces, probably, will be encountered more frequently. The latter statement is supported by experimental findings with NaCl. Conclusions: (1) The complex of possible faces of a crystal (faces that appear in the crystallization of spheres) is fundamentally determined by its translational lattices, and more especially the reticular plane of its lattice points in the respective planes; (2) small deviations from the calculated order of the faces indicate that individual peculiarities of the structures exert some, but only a secondary, effect. Orig. art. has 1 table.

Card 2/3

L 18912-63

ACCESSION NR: AT3001901

EWI(1)/EWP(q)/EWI(m)/BDS

AFETC/ASD/ESD-3/IJP(C) JD

S/2912/62/000/000/0108/0113

AUTHOR: Belyustin, A. V.

TITLE: Does the lattice govern the formation of faces in a crystal? 60

SOURCE: Kristallizatsiya i fazovyye perekhody*. Minsk, Izd-vo AN BSSR, 1962, 108-113.

TOPIC TAGS: crystal, crystallization, crystallography, face, lattice, lattice point, cubic, rhombic

ABSTRACT: This paper comprises a literature survey and a report on experimental findings relative to the effect of impurities in the growing of crystalline faces on crystalline spheres; more specifically, the study investigates the peculiar close connection of the complex of crystalline faces thus developed with the lattice structure, which causes the effect of impurities thereon to be much smaller than would be the case in the growth of crystals from solutions. The experimental crystallization was performed in pure solutions with a very small degree of supersaturation, because more crystalline faces form as we approach the saturation point. A number of crystals of cubic salts were obtained by the spherical-crystal method, and the development of the various faces is discussed in the light of the role of the

Card 1/3

The effect of...

8/564/57/000/000/012/029
D258/D307

rates relative to the rate of growth of the {110} face tended to pass through a maximum at $\sim 0.02 \text{ g/cm}^3$ supersaturation (pure) and at $0.02 - 0.08 \text{ g/cm}^3$ (in the presence of borax). Crystal forms of all substances tested tended to simplify at smaller and greater supersaturations and were also affected by the admixtures tried. The latter did not, however, influence the change of relative rates of growth of various faces.

Card 2/2

S/564/57/000/000/012/029
D258/D307

AUTHOR: Belyustin, A. V., and Dveryankin, V. P.
TITLE: The effect of supersaturating the solution on crystal form
SOURCE: Rost kristallov; doklady no Pervom soveshchaniu po rostu kristallov, 1956 g. Moscow, Izd-vo AN SSSR, 1957, 174-177

TEXT: The authors measured the relative rates of growth of crystal faces in solutions of Seignette's salt (pure and with admixtures of borax) and K and NH_4 alums (with admixtures of Na_2CO_3) in order to elucidate the effect of solution concentration on form of the resulting crystals. The work was motivated by conflicting results found in the literature. In alums, the relative rates of growth of {111} : {100} faces decreased rapidly with increasing supersaturation, while in Seignette's salt the

Card 1/2

The influence of motion and the ... S/070/62/007/002/011/022
E132/E160

over crystallographically different faces and by the consequent
redistribution of solute.

There is 1 table.

ASSOCIATION: Issledovatel'skiy fiziko-tekhnicheskiy institut
pri Gor'kovskom universitete im. N.I. Lobachevskogo
(Physicotechnical Research Institute at Gor'kiy
University imeni N.I. Lobachevskiy)

SUBMITTED: March 17, 1961

Card 2/2

34.7100

S/070/62/007/002/011/022
E152/E160

AUTHORS: Belvustin, A.V., and Portnov, V.N.

TITLE: The influence of motion and the facial development
of a crystal on the rate of growth of its faces

PERIODICAL: Kristallografiya, v.7, no.2, 1962, 276-279

TEXT: The rate of growth of faces on crystals of potassium aluminium alum was measured under a variety of conditions. Crystals with natural faces and ground spheres with dimensions about 15-20 mm were used and they were grown in a solution with 2 g/l supersaturation (at 20 °C) sometimes with movement and sometimes without. In dynamic conditions the rate of growth of faces depends more strongly on the state of the surroundings than under static conditions. Planetary and axial rotation exaggerate the rate of growth of those faces which grow more rapidly under static conditions. This is most evident for faces developing on a sphere. The influence of the form and motion of the crystal on the relative growth of its faces can be best explained by the different supersaturations

Card 1/2

BELYUSTIN, A.V.

Simple method for growing crystals from solutions. Kristallografiia
6 no.5:807-808 S-0 '61. (MIRA 14:10)

1. Issledovatel'skiy fiziko-tehnicheskii institut pri Gor'kovskom
universitete.

(Crystals--Growth)

Crystallization of spheres ...

S/081/62/000/013/002/054
B150/B144

at low concentrations, but a selective effect at high concentrations: At 100% excess of $\text{Al}_2(\text{SO}_4)_3$ in the alum solution, faces {211} develop noticeably more actively, while faces {221} are suppressed. The selective effect of an impurity or combination of impurities can spread to the whole range of orientations and the growth of a rounded surface becomes possible. The method of crystallizing spheres explains how an impurity affects the development and quality of a large number of faces, and enables a more thorough study of the general and selective effect of impurities. Impurities that substantially affect the process of crystal growth have a relatively weak effect on the complex of faces appearing on a sphere. Some impurities retard deposition of a substance on considerable sections of the sphere's surface and alter its character in such a way that the corresponding sections remain transparent. [Abstracter's note: Complete translation.]

Card 2/2

S/081/62/000/013/002/054
B158/B144

AUTHORS: Belyustin, A. V., Kolina, A. V., Stepanova, N. S.

TITLE: Crystallization of spheres in the presence of impurities

PERIODICAL: Referativnyi zhurnal. Khimiya, no. 13, 1962, 43 - 44,
abstract 13B250 (Sb. "Rost kristallov. v. 3". M., AN SSSR,
1961, 152 - 155)

TEXT: The effect of impurities on the form and quality of crystals growing on crystalline spheres from solutions was studied. Tests were carried out on crystallization of spheres of alumopotassium alum and Rochelle salt. Spheres of 10-15 mm dia. were suspended in the solution; thus it was noted which faces appeared in the presence of certain impurities. NaOH and KOH impurities result in the best development of all faces of Rochelle salt and improve their quality; $Al_2(SO_4)_3$ has a similar effect on alum. In other cases, impurities have a selective effect: H_2SO_4 causes a weakening in the {221} faces of alum, and faces {211} become larger. One and the same impurity can have the same effect on all faces

Card 1/2

SOV/70-4-4-24/34
On the Question of the Solubility of Different Faces of a Crystal
There are 1 figure and 5 Soviet references.

ASSOCIATION: Issledovatel'skiy fiziko-tekhnicheskiy institut
Gor'kovskogo universiteta (Physico-technical Research
Institute of Gor'kiy University)

SUBMITTED: March 11, 1958

Card 2/2

AUTHOR: Belyustin, A.V. SOV/70-4-4-24/34
TITLE: On the Question of the Solubility of Different Faces of
a Crystal
PERIODICAL: Kristallografiya, 1959, Vol 4, Nr 4, pp 609-612 (USSR)
ABSTRACT: In studying the question of the solubilities of different
faces of a crystal it is necessary to take into account
the real structure of the crystal and the dimensions and
character (stability) of the faces. The solubility of
stable faces bounded in dimensions of a uniform crystal
depends on the boundary conditions. As the dimensions of
the faces increase, i.e., as the role of the boundary
conditions decreases, the solubilities of all faces
approximate to the same value. The transfer of material
from a stable face to an unstable one can proceed only
in as much as it helps to build up the surface of the
latter and bring the system towards an equilibrium state.
The results are arrived at theoretically from thermo-
dynamic considerations.

Card1/2

S/058/62/000/009/016/069
A006/A101

8.1400
AUTHOR: Belyustin, A. V.

TITLE: On the possibility of determining surface energies of crystals from equilibrium states

PERIODICAL: Referativnyy zhurnal, Fizika, no. 9, 1962, 8, abstract 9E58
(In collection: "Rost kristallov. T. 2", Moscow, AN SSSR, 1959, 70 - 72) JB

TEXT: The author analyzes methods of determining free surface energy on the crystal-medium interface from the equilibrium state of the crystal in a gravitational field. Equilibrium systems are analyzed where 1) the cubic crystal is located on the crystallizer bottom; 2) a capillary is prepared from the crystal, the capillary being in contact with the mother medium; 3) the crystal is suspended on a thread and its lower section contacts the mother medium; 4) the crystal has grown fast to the crystallizer bottom; 5) the crystal has grown fast to the crystallizer lid, which is entirely filled with the mother medium; 6) two differently oriented crystals have grown fast into the tube of variable

Card 1/2

BELEVUSTIN, A. V.

24(2)

PAGE 1 BOOK EXPLANATION 57/235

Academy of Sciences, Institute of Crystallography
 Book 2 (Growth of Crystals, Vol. 2) Moscow, 1959. 298 p.
 Series also issued. 2,000 copies printed.

Step 1: A. V. Belevustin, Academician, and B. B. Sorfial, Doctor of
 Geological and Mineralogical Sciences, Editor of Publishing House:
 E. B. Akademicheskii. Moscow, 1959. 12 p. 12 p.

REMARK: This book is intended for scientists and researchers engaged in
 crystallography and in growing industrial microcrystals.

CONTENTS: This is the second of two volumes on crystal growth. The first
 volume contained reports on the first Congress on Crystals
 which contained reports on an extensive study of growth of Soviet
 the present volume also contains an extensive study of growth of Soviet
 by A. V. Belevustin (Editor). These studies reflect the first Congress.
 Research contains some essentially new results obtained by Soviet scientists.
 The authors express the hope that the results will unite the efforts of
 let scientists engaged in studying the process of crystal growth and in grow-
 ing industrial valuable microcrystals. No illustrations are mentioned.

Belevustin, A. V., I. O. Chentsov, and A. A. Shenberg. The Growth and
 from the State of Synthetic Quartz Crystals

Belevustin, A. V. Crystallization of Ca on a Surface and Microcrystal
 from the State of Synthetic Quartz Crystals

Belevustin, A. V. Possibility of Separating Surface Energy of
 Crystals from Equilibrium State

II. GROWTH OF MICROCRYSTALS (APPARATUS, METHODS,
 EXPERIMENTAL DATA)

Belevustin, A. V. Growth of Crystals and of Other Carbonates

Belevustin, A. V., and V. S. Akademicheskii. Growth of Antimony
 Microcrystals

Belevustin, A. V. Organization of Microcrystals of Organic Nitrates

Belevustin, A. V., and A. V. Zolotarev. Crystallization of Nitrates
 from Liquid and Gas Phases

Belevustin, A. V. Studying the Process of Surface Tension Crystal
 Growth in a Press Solution with Surface Chloride

Belevustin, A. V., O. S. Bilyumov, and G. P. Dobrynina. Apparatus
 for Growing Crystals from a Melt

Belevustin, A. V. New Type of Pneumatic Compressor for the Production of
 Surfaces by High Gas Pressures

Belevustin, A. V. Growth of a Monophase Crystal and Its Properties
 Logical Symmetry

Belevustin, A. V., and I. V. Shapovalov. Synthesis of CaF_2 and
 of Sodium Fluoride and Barium Fluoride for Growing Optical Microcrystals

Belevustin, A. V. Effect of Cooling Conditions on the Creation of
 Microcrystals on the Surface of Relocations in Germanium Crystals

Belevustin, A. V., and I. V. Shapovalov. Oxidation-Aluminum CaF_2 - CaF_2
 (Synthesis), Growth of Microcrystals, and some Properties of the Microcrystals

Belevustin, A. V. Crystallization of Germanium on Silicon and Silicon on Ger-
 manium

Belevustin, A. V. Growing and Certain Uses of Germanium Crystals

III. SHORTS AND DISCUSSION ARTICLES

Belevustin, A. V. Relocation in Germanium Crystals (Survey)

Belevustin, A. V. Main Trends in the Study of Micro Systems: Inorganic
 Crystals - Organic Additives (Survey)

AVAILABLE: LIBRARY OF CONGRESS

* Research Physics - Technical Institute of
 Non-Linear

On the Equilibrium Forms of Crystals in a Gravity field. 70-5-3/31

ASSOCIATION: Physico-technical Research Institute, **Gorkiy** University.
(Issledovatel'skiy fiziko-tekhnicheskiy Institut
Gor'kovskogo universiteta)

SUBMITTED: January 30, 1957.

AVAILABLE: Library of Congress
Card 3/3

70-5-3/31

On the Equilibrium Forms of Crystals in a Gravity Field.

where s is the area of the bottom of the vessel. The aspect ratio of the crystal then becomes:

$$h/a = \beta a / (a + \alpha v) \quad \text{where} \quad \beta = 1/2 + (\sigma_{13} - \sigma_{23}) / 2\sigma_{12}.$$

If the crystal shape is rhombohedral then the first relation becomes $h/a = a / (ka + \alpha v)$, where $1/k$ is the cosine of the angle between the inclined face of the rhombohedron and the vertical, and the second relation becomes $h/a = \beta a / (ka + \alpha v)$. Using NaNO_3 , which is rhombohedral, these two relationships

were tested; in the second case the crystal, not adhering naturally to the bottom, was cemented down. Variations in shape caused by oscillations in the temperature were found to be completely suppressed by inverting the crystal periodically. Whether free or cemented, the crystal reached a limiting form in equilibrium if the temperature oscillations were small ($< 5^\circ\text{C}$). The expressions for h/a derived above were confirmed in their variation with the size of the crystal. β was found to be about $1/2$. The times to reach limiting forms varied from a few hours to a few days. Acknowledgments to

Card 2/3 Academician A.V. Shubnikov. There are 3 Slavic references.

AUTHOR: Belyustin, A.V.

70-5-3/31

TITLE: On the Equilibrium Forms of Crystals in a Gravity Field
(O ravnovesnoy forme kristallov v pole sily tyazhesti)

PERIODICAL: Kristallografiya, 1957, Vol.2, No.5, pp. 590-593 (USSR)

ABSTRACT: The effect of gravitational forces on the equilibrium shape of a crystal growing from a solution on the bottom of a vessel is examined. For a crystal bounded by cube faces, the height of the tetragonal prism dictated by the symmetry of the physical conditions is h and its width a . If the density of the crystal is ρ_1 and of the solution ρ_2 , then the potential energy of the crystal is $V = 1/2 g (\rho_1 - \rho_2) a^2 h^2$.

If σ_{12} is the specific surface energy crystal/solution, the surface energy is $W = (2a^2 + 4ah)\sigma_{12}$ so that the free energy is $F = V + W$. The condition for minimum free energy,

$dF/da = 0$ gives $h/a = a/(a + \alpha v)$, where $a^2 = v/h$ and $\alpha = g(\rho_1 - \rho_2)/4\sigma_{12}$. If the crystal grows in contact with the bottom of the vessel there are further surface energy terms making $W = (a^2 + 4ah)\sigma_{12} + a^2\sigma_{13} + (s - a^2)\sigma_{23}$

Card 1/3

USSR / Physical Chemistry. Crystals.

B-5

Abs Jour : Ref Zhur - Khimiya, No 8, 1957, 25982

Abstract : 0.054 mm/hour, and with a 100% excess of K^+ it is 0.035 mm/hour. The cube faces increase and the rhombododecahedron faces diminish, if Al^{3+} were in excess. If NH_4^+ or K^+ were in excess, the opposite is observed.

Card : 2/2

BELYUSTIN A. V.

USSR / Physical Chemistry. Crystals.

B-5

Abs Jour : Ref Zhur - Khimiya, No 8, 1957, 25982

Author : A.V. Belyustin

Inst : Academy of Sciences of USSR

Title : Influence of Excess of One of Components on Growth Speed of Crystals of Double Salts in Solution.

Orig Pub : Tr. In-ta kristallogr. AN SSSR, 1956, vyp. 12, 73 - 78

Abstract : Crystals of $KAl(SO_4)_2 \cdot 12H_2O$, $NH_4Al(SO_4)_2 \cdot 12H_2O$ and $(NH_4)_2Ni(SO_4)_2 \cdot 6H_2O$ were grown at 20° in supersaturated aqueous solutions prepared by dissolving crystals of these alums. The speed of the crystal growth increases with the addition to the solution of the component (sulfate) containing cations of lesser mobility (Al^{3+} , Ni^{2+}), and it decreases at an excess of cations of greater mobility (K^+ , NH_4^+). At a certain excess of Al^{3+} or Ni^{3+} , the speed reaches a maximum. The linear speed of growth of $KAl(SO_4)_2 \cdot 12H_2O$ is 0.042 mm/hour in case of a pure solution, with a 100% excess of Al^{3+} it is

Card : 1/2

USSR/Physics - Crystal growth

FD-2347

Card 1/1 Pub. 146 - 12/34

Author : Belyustin, A. V.

Title : Discussion. Theory of crystal growth (concerning the article of I. V. Salli, ibidem, 25, 208, 1953)

Periodical : Zhur. eksp. i teor. fiz. 28, 725-726, Jun 1955

Abstract : The present writer claims that I. V. Salli made a number of erroneous statements in his article "Theory of crystal growth" which considerably depreciate the conclusions arrived at by the writer. At the basis of I. V. Salli's discussions lie his formula (5) for the linear rate of growth u of a spherical nucleus of the new phase and the well known assumptions proceeding from it, namely: $u = Dv(\Delta - a/r)(1/x + 1/r)$, after the necessary correction of a factor 2 (otherwise the volume of sphere is $2\pi r^3/2!$). Three references: e. g. V. D. Kuznetsov, Kristally i kristallizatsiya, GITTL, 1953; Obrazovaniye kristallov, Acad. Sci. USSR Press, 1947.

Institution : Gor'kiy Physicotechnical Institute

Submitted : October 27, 1953

BELYUSTIN, A.Y.

Relation between the boule structure of synthetic corundum and
the crystallographic direction of orientation and growth. Trudy Inst.
krist. no.8:247-252 '53. (MLRA 7:5)

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(Corundum)

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BOBROV, V.S.; LUTUGINA, N.V.; MOLODENKO, P.Ya.; ZAKHAR'YEVSKIY,
M.S.; STEFANOVA, O.K.; BELYUSTIN, A.A.; MATEROVA, Ye.A.;
NIKOL'SKIY, B.P., ~~otv. red.~~; POZDYSHOVA, V.A., red.

[Theoretical and practical guide to laboratory work in
physical chemistry] Teoreticheskoe i prakticheskoe ruko-
vodstvo k laboratornym rabotam po fizicheskoi khimii.
[Leningrad] Izd-vo Leningr. univ. Pt.1. 1965. 197 p.
(MIRA 18:12)

1. Leningrad. Universitet. 2. Chlen-korrespondent AN SSSR
(for Nikol'skiy).

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ACCESSION NR: AP5012556

24

glass are obtained as functions of the Fe_2O_3 concentration in the glass and of the amount and nature of the alkali iron. It is shown that the Mossbauer effect can be used to detect iron oxides colloiddally dispersed in glass. "The authors thank A. N. Murin and Docent M. M. Shul'ts, who stimulated their interest in this topic, and also A. I. Sekirin, V. I. Khilus, L. A. Marshuk, and G. V. Filomenko for help with the measurements." Orig. art. has: 7 figures, 7 formulas, and 2 tables.

ASSOCIATION: Ob'yedinennyi institut yadernykh issledovaniy (Joint Institute of Nuclear Research), Leningradskiy gosudarstvennyy universitet (Leningrad State University)

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OTHER: 008

Card 2/2

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JD/JG/JAJ/WH

ACCESSION NR: AP5012556

UR/0181/65/007/005/1447/1454

AUTHOR: Belyustin, A. A.; Ostanevich, Yu. M.; Pisarevskiy, A. M.; Tomilov, S. B.;
Wu, Pai-shih, CHSR, L. 44, 55

TITLE: The Mossbauer effect in alkali-iron-silicate glasses

SOURCE: Fizika tverdogo tela, v. 7, no. 5, 1965, 1447-1454

TOPIC TAGS: Mossbauer effect, emission line, glass property, silicate glass, line splitting

ABSTRACT: The authors investigated the Mossbauer effect with the aid of apparatus with sinusoidal motion, described briefly elsewhere (ZhETF v. 46, 482, 1964). The source was Co^{57} , introduced by diffusion into metallic chromium. The width of the emission line was 0.35 mm/sec, and the position of the emission line practically coincided with the absorption line of stainless steel. The absorbers were powdered glass pressed together with small amounts of MgO . All the measurements were made at room temperature. Various compositions of glass were investigated. Values were obtained for the main parameters of the Mossbauer spectra (line width, chemical shift, quadrupole splitting). It is shown that the form of the Mossbauer spectra is governed by the main features of the structure and chemical composition of the glasses. The ratios of the different valence and structural states of iron in the

Card 1/2

BELYUSTIN, A.A.; PISAREVSKIY, A.M. (Leningrad)

Structural state of iron in glass from studies of the electrode properties of sodium iron silicate glasses. Zhur. fiz. khim. 38 no.12:2913-2919 D '64. (MIRA 18:2)

1. Leningradskiy gosudarstvennyy ordena Lenina universitet imeni A.A. Zhdanova.

KASYMOVA, S.S.; BELYUSTIN, A.A.

Electrode properties of sodium-strontium silicate glasses. Uzb.
khim.zhur. 8 no.5:61-66 '64. (MIRA 18:5)

1. Institut khimii AN UzSSR i Leningradskiy gosudarstvennyy
universitet imeni Zhdanova.

BELYUSTIN, A.A.; OSTANEVICH, Ye.M.; PISAREVSKIY, A.M.; POMILOV, S.B.; U BAY-SHI;
CHER, L.

Mossbauer effect in alkali ferrosilicate glasses. Fiz. tver. tela " no. 3:
1447-1454 My '65. (SIRA 18:5)

1. Ob'yedinenyy institut yadernykh issledovaniy i Leningradskiy
gosudarstvennyy universitet.

ACCESSION NR: AT4040547

produced differentiation with respect to the stability of the bonds to H^+ ions similar to that obtained for the R_2O_3 oxides. In sodium and lithium silicate glasses, ZrO_2 showed similar results. The electrode behavior of alkali silicate glasses into which oxides of Ti and Zr are incorporated can be explained by the formation of bonds in which the atoms of these elements are surrounded by oxygen in such a way that a complex is formed which carries a negative charge and which determines the predominantly ionic bond of hydrogen in the glass. Addition of barium oxide to lithium silicate glasses containing ZrO_2 seems to abolish the glass forming properties of ZrO_2 . Orig. art. has: 7 figures.

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the series of $24\% \text{Li}_2\text{O} - X\% \text{R}_2\text{O}_3 - (76-X)\% \text{SiO}_2$, when $\text{R}=\text{B}, \text{Al}, \text{Ga}$, in order to obtain the same effect it is necessary to incorporate more Ga_2O_3 than Al_2O_3 and more B_2O_3 than Ga_2O_3 , which means that the effect of Ga_2O_3 on the electrode properties is between the effects of B_2O_3 and Al_2O_3 . Analogous results were obtained with glasses containing 27 and 30% Li_2O . In glass of the system $22\% \text{Na}_2\text{O} - X\% \text{Ga}_2\text{O}_3 - (78-X)\% \text{SiO}_2$, added gallium acts as a glass former and to some extent as a modifier. In a system containing $22\% \text{Na}_2\text{O} - X\% \text{In}_2\text{O}_3 - (78-X)\% \text{SiO}_2$, it was observed that the deviation from the hydrogen function increased with an increase in In_2O_3 , but was less than with Ga_2O_3 . In glass of the system $22\% \text{Na}_2\text{O} - 4\% \text{R}_2\text{O}_3 - 74\% \text{SiO}_2$ ($\text{R}=\text{B}, \text{Al}, \text{Ga}$ and In), the effect of the R_2O_3 oxides on the electrode behavior of sodium silicate glasses decreased in the order $\text{Al} > \text{Ga} > \text{In}$, as in the lithium silicate glasses. This order is characteristic for glasses when $[\text{R}_2\text{O}_3]/[\text{Na}_2\text{O}] < 0.3$. If $0.3 < [\text{R}_2\text{O}_3]/[\text{Na}_2\text{O}] < 1$, the order is different: $\text{Al} > \text{B} > \text{Ga} > \text{In}$; while if $[\text{R}_2\text{O}_3]/[\text{Na}_2\text{O}] > 1$, the order is $\text{Ba} > \text{Al} > \text{Ga} > \text{In}$. In the system $\text{Na}_2\text{O} - \text{TiO}_2 - \text{SiO}_2$ where $\text{Na}_2\text{O} = 16-22 \text{ mol. \%}$, the effects were characteristic for the oxides of glass formers, and analogous data were obtained with some $\text{LiO}_2 - \text{TiO}_2 - \text{SiO}_2$ systems. Relatively small amounts of TiO_2

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AUTHOR: Shul'ts, M.M., Peshekhonova, N.V., Belyustin, A.A., Parfenov, A.I., Bobrov, V.S.

TITLE: Electrode properties of alkali silicate glasses containing the oxides of gallium, indium, titanium and zirconium

SOURCE: Soveshchaniye po khimii redkikh elementov. Leningrad, 1961. Khimiya redkikh elementov (Chemistry of rare elements); doklady* soveshchaniya. Leningrad, Izd-vo Leningr. univ., 1964, 96-105

TOPIC TAGS: glass, silicate glass, electrode behavior, silicate glass electrical property, rare earth oxide, alkali silicate glass, gallium oxide, indium oxide, titanium oxide, zirconium oxide

ABSTRACT: After a theoretical review of the electrode properties of various glasses and the relationship between the EMF of an Ag AgCl, HCl glass buffer KCl, Hg₂Cl₂ Hg cell and pH, the authors describe the effect of the addition of various amounts of rare oxides to lithium-silicate, lithium-aluminum-silicate, sodium-aluminum-silicate, and sodium-barium-aluminum-silicate glasses. In glasses of

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BELYUSTIN, A.A.; PISAREVSKIY, A.M.; SHUL'TS, M.M.; NIKOL'SKIY, B.P.

Glass electrode sensitive to the change in oxidation
potential of solution. Dokl. AN SSSR 154 no.2:404-406
Ja'64. (MIRA 17:2)

1. Leningradskiy gosudarstvennyy universitet im. A.A.
Zhdanova. 2. Chlen-korrespondent AN SSSR (for Nikol'skiy).

BELYUSTIN, A. A.; PISAREVSKIY, A. M. 7

"Concerning the structural state of iron in glass.

report submitted for 4th All-Union Conf on Structure of Glass, Leningrad,
16-21 Mar 64.

BELYUSTIN, A.A.

Infrared absorption spectra of water contained in the surface
layers of electrode glasses. Vest. LGU 18 no.4:471-174 '63.
(MIRA 16:3)
(Electrodes, Glass) (Water--Absorption spectra)

Electrode behavior of sodium silicate ... S/054/63/004/001/017/022
B101/B215

Conclusion: In sodium silicate glass the oxides of the elements in groups IV and V of the periodic system form element-oxygen structural units which can be proved by examining the glass electrode. There are 5 figures.

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Electrode behavior of sodium silicate ...

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narrower owing to the formation of strongly ionogenic $[\text{GeO}_{6/2}]^{2-}$ groups whose content is lower than that of GeO_4 groups. (3) SnO_2 addition causes intensive formation of $[\text{SnO}_{6/2}]^{2-}$ groups; the effect of the glass forming oxide is very distinct and is comparable to that of Al_2O_3 . (4) Glasses containing more than 4 mole% P_2O_5 were unstable, they dissolved rapidly in 0.1 N HCl. The curve E versus pH consists of two intersecting lines, the inclination of the second section being 24 - 33 mv/pH, i. e. close to $v/2$. The microinhomogeneity of the glass is assumed to be responsible for the above phenomenon. Addition of BaO neutralizes the effect of P_2O_5 . (5) Sb_2O_3 and Bi_2O_3 yielded only very unstable glasses, but various series of tests gave orientation data. In Sb_2O_3 , the effect of the glass-forming oxide Sb_2O_3 which yields $[\text{SbO}_{4/2}]^-$ groups becomes superposed on the effect of the modifying ions Sb^{III} (probably SbO^+ ion). The formation of ionogenic $[\text{SbO}_{6/2}]^{2-}$ groups is possible. In Bi_2O_3 , the effect of the strongly acid groups decreases as the Bi_2O_3 content increases.

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